

The Lessons Learned Vacuum of Space

**PM Challenge 2012
February 22-23, 2012**

**Patricia Foltz and Lori Crocker
EVA Office
NASA Johnson Space Center**

PM Challenge Lessons Learned



- “Failure is not an Option” – Lessons Learned, when mistakes are not repeated, keep us from failing!
- Fundamentally, no one disagrees with this philosophy
- So why do we struggle as an Agency to get our workforce to...
 - Share their lessons learned?
 - Search out lessons learned?
- Why do lessons learned get such a bad rap? Is it deserved? If it isn't, what do we do about it?
- In other words, why do we have a lessons learned vacuum of space?
- **We have some ideas!** 
- But first, let's talk about the Agency's requirements for Lessons Learned ...



LESSONS LEARNED PROCESS - NPR 7120.6

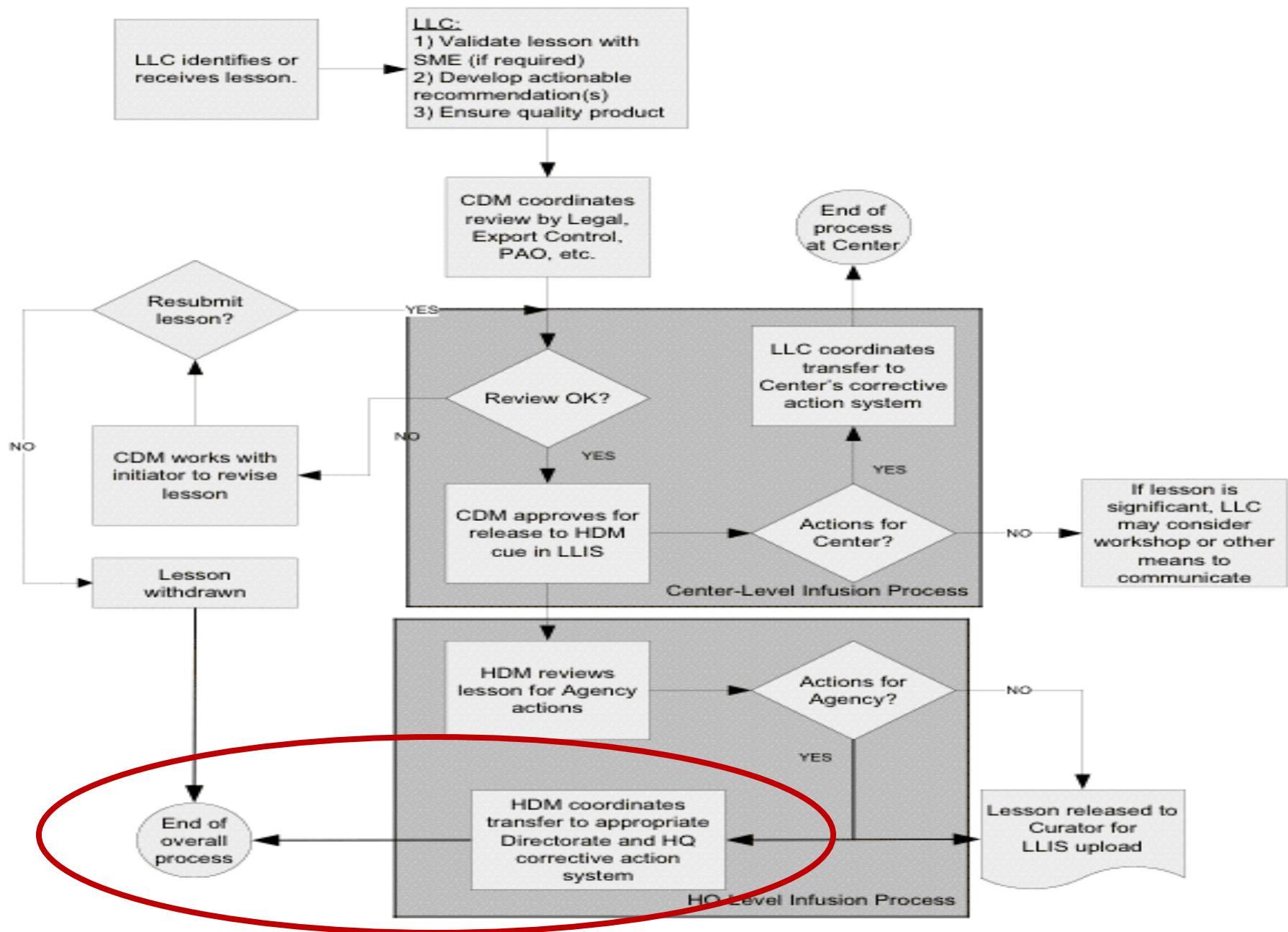
- Establishes the requirements for the collection, validation, assessment, and codification of lessons learned submitted by individuals, NASA directorates, programs and projects, and any supporting organizations and personnel.
- The lessons learned process is a two-level (Centers and HQ) set of information management processes designed to preserve:
 - Institutional knowledge
 - Communicate experiences which can potentially reduce risk
 - Improve efficiency
 - Promote validated practices
 - Improve performance in the areas identified as but not limited to:
 - Engineering
 - Technical
 - Science
 - Operations
 - Administrative
 - Procurement
 - Management
 - Safety
 - Maintenance
 - Training
 - Flight or ground-based systems
 - Facilities
 - Medical
 - other activities

LESSONS LEARNED PROCESS NPR 7120.6

- **Lessons shall be collected from individuals, projects and programs, or supporting organizations primarily at the Center level.**
 - The content of lessons learned systems in the NASA environment shall be discoverable and searchable across the Agency to the broadest extent possible.

LESSONS LEARNED PROCESS NPR 7120.6

- Lesson recommendations shall be assessed for potential changes to policy, procedures, guidelines, technical standards, training, education curricula, etc. and infused back into the system via existing corrective action systems.
- This NPR explains how to process the knowledge captured under NPR 7120.5, NPR 8621.1, and the other referenced documents through two principle requirements:
 - Establishment of lessons learned committees at the Center level
 - Closed-loop infusion of lessons learned recommendations into Center and HQ documentation and training. Contractors are encouraged to use their existing lessons learned processes and systems where they meet the requirements of this NPR



Key:

CDM: Center Data Manager
 HDM: Headquarters Data Manager
 HQ: Headquarters
 LLC: Lessons Learned Committee
 LLIS: Lessons Learned Information System
 PAO: Public Affairs Office

We use the typical vehicles to get the lessons we have learned out to the community at large

websites



databases



Knowledge Online

QMS

Lean 6 Sigma

Create A Lesson

All Lessons



About this Database



Welcome to the Johnson Space Center Lessons Learned Database.

This database is the official vehicle for documenting lessons learned in various Johnson Space Center programs.

Currently the Lessons Learned process has undergone an extensive redesign. The new process can be found in JPR 2310.1 "The JSC Organizational Learning Program".

The ownership of the Lessons Learned Process is the Chief Knowledge Officer. The JSC Lessons Learned Process is composed of local lessons learned programs supported by and coordinated through the JSC Center Data Manager.

The lessons we have learned are captured in this database and are intended to be used as tools for improvement.

Information contained within this database may be subject to Export Control and/or International Trade in Arms Regulations.

[JSC Hurricane Ike Lessons Learned Report May 2009](#)

[Web Accessibility and Policy Notes](#) | [JSC Home](#)

Responsible NASA Official: [Brent J. Fontenot](#) | Curator: [Orlando Bongat](#) | [Site Administration](#)

Last Modified: 04/13/2011



XA Resources and Records

- ▶ [Archives/Historical](#)
- ▶ [EVA Documents](#)
- ▶ [EVA Milestone Review Schedule](#)
- ▶ [EVA Office CRs](#)
- ▶ [Fitchecks](#)
- ▶ [Flight Assignments Matrix](#)
- ▶ [Flight/Mission Info](#)
- ▶ [Metrics](#)
- ▶ [Miscellaneous Meetings](#)
- ▶ [Rotation Plans & ESELs](#)
- ▶ [XA Groups/Boards/Panels](#)

[Search All Postings](#)

Site Links

- ▶ [Crew Consensus Report database](#)
- ▶ [EVA Historical Archive](#)
- ▶ [EVA Lessons Learned](#)
- ▶ [EVA Tools Catalog](#)
- ▶ [Go4EVA](#)
- ▶ [Lessons Learned/CCB database](#)
- ▶ [One EVA Dashboard](#)
- ▶ [On-Orbit Tracking Database](#)

Announcements and Events

There are no new announcements.

[View All Announcements](#)

EVA Operations Office Calendar

- [Monthly Calendar](#)
- [Weekly Calendar](#)
- [Daily Calendar](#)



LESSONS LEARNED

Links

- ▶ [EVA Lessons Learned Database](#)
- ▶ [ISS Payloads Lessons Learned](#)
- ▶ [JSC Knowledge](#)
- ▶ [JSC Lessons Learned](#)
- ▶ [NASA Engineering Network \(NEN\)](#)
- ▶ [NASA Lessons Learned](#)

Featured EVA Lessons Learned

- ▶ [Featured Lesson Learned](#)
- ▶ [Archived Featured Lessons](#)
- ▶ [11.15.2011 | Change is Imminent... | Organization: XA | Originator: Patricia Foltz](#)
- ▶ [10.25.2011 | Configuration Management in EV... | Organization: XA | Originator: Patricia Foltz](#)
- ▶ [10.18.2011 | In-Suit Battery Recharge Anoma... | Organization: XA | Originator: Patricia Foltz](#)
- ▶ [12.02.2011 | The Importance of Having a Pla... | Organization: XA | Originator: Patricia Foltz](#)

EVA Lessons Learned Opportunities

- ▶ [Submit an EVA Lessons Learned Opportunity / Event](#)
- ▶ [Opportunity / Event Calendar](#)
- ▶ [Archived EVA Lessons Learned Opportunities / Events](#)
- ▶ [EVA Lessons Learned Questions & Answers / Submit an EVA Lessons Learned / Archive Q & A](#)

EVACCB

Logged in as : Patricia Foltz

[CCB HOME](#) | [LESSONS LEARNED HOME](#) | [ADMIN](#)

Lessons Learned

Query:

Lesson Number:

Mission Number:

Organizations:

Contact:

Category:

Keyword:

Date Range:

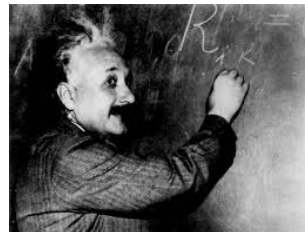
PM Challenge Lessons Learned



- But what else do we need to do?



- Why don't our typical tools and processes elicit more support from employees?



- We had some theories, and some ideas... but wanted to (informally) solicit input





Lessons Learned Survey

Question 1



Invites to EVA community, NASA Civil Servants and Contractors
Informal, non-scientific survey & results!

If you had to summarize the
NASA Lessons Learned Program
in one word, what would that word be?

- *Ineffective*
- *Unknown*
- *Underutilized*
- *Tedious*
- *Vague*
- ***Experience***
- ***Beneficial***
- ***Good idea***
- *Documented but not used*
- ***Consistent***
- *Meek*
- *Voluminous*
- ***Helpful***
- ***Requirements***
- *Sketchy*
- *Underused*

If you had to summarize the
EVA Office Lessons Learned Program
in one word, what would that word be?

- ***Accessible***
- ***Good implementation***
- *Inert*
- *Assessed so that it could help*
- *Informal*
- ***Beneficial***
- *Start Early in Program*
- *Hidden*
- ***Above Average***



Lessons Learned Survey

Question 2



For you personally, what is the biggest hindrance to seeking out and using lessons learned before you start a new activity?

- Time
- Access to useful IT Tool
- Don't think of it
- Don't know how to take a lessons learned
- Other
 - Lack of communication between teams
 - It isn't part of the required pre-flight/increment reviews
 - Having the Program acknowledge the lesson and acting upon it from the beginning

Personal Biggest Hindrance



■ Time

■ Access to useful IT Tool

■ Don't think of it

■ Don't know how to apply

■ Other



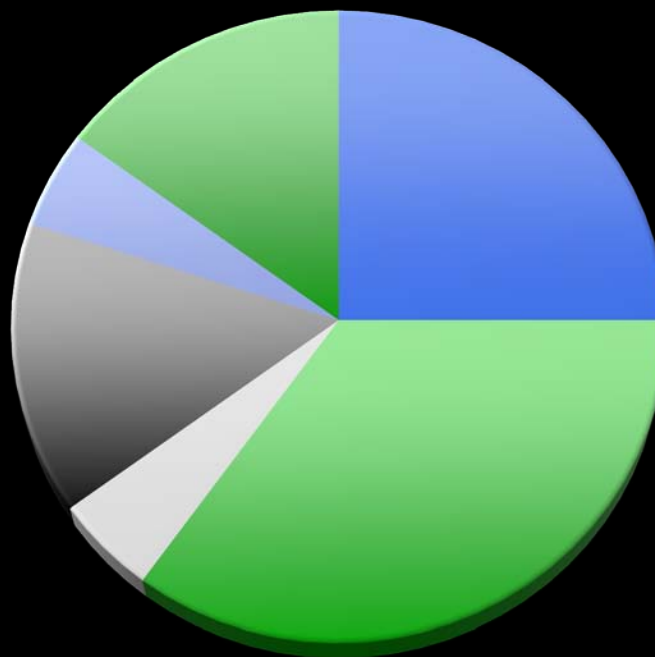
Lessons Learned Survey Question 3



To NASA civil service & contractor employees in general, what is the biggest hindrance to seeking out and using lessons learned before a new activity is started?

- Time
- Access to useful IT Tool
- Not important enough
- Don't think of it
- Don't know how to take a lessons learned
- Other
 - Asking co-workers for input
 - I'm a contractor

NASA Community in General Biggest Hindrance



- Time
- Access to useful IT Tool
- Not important enough
- Don't think of it
- Don't know how to apply
- Other



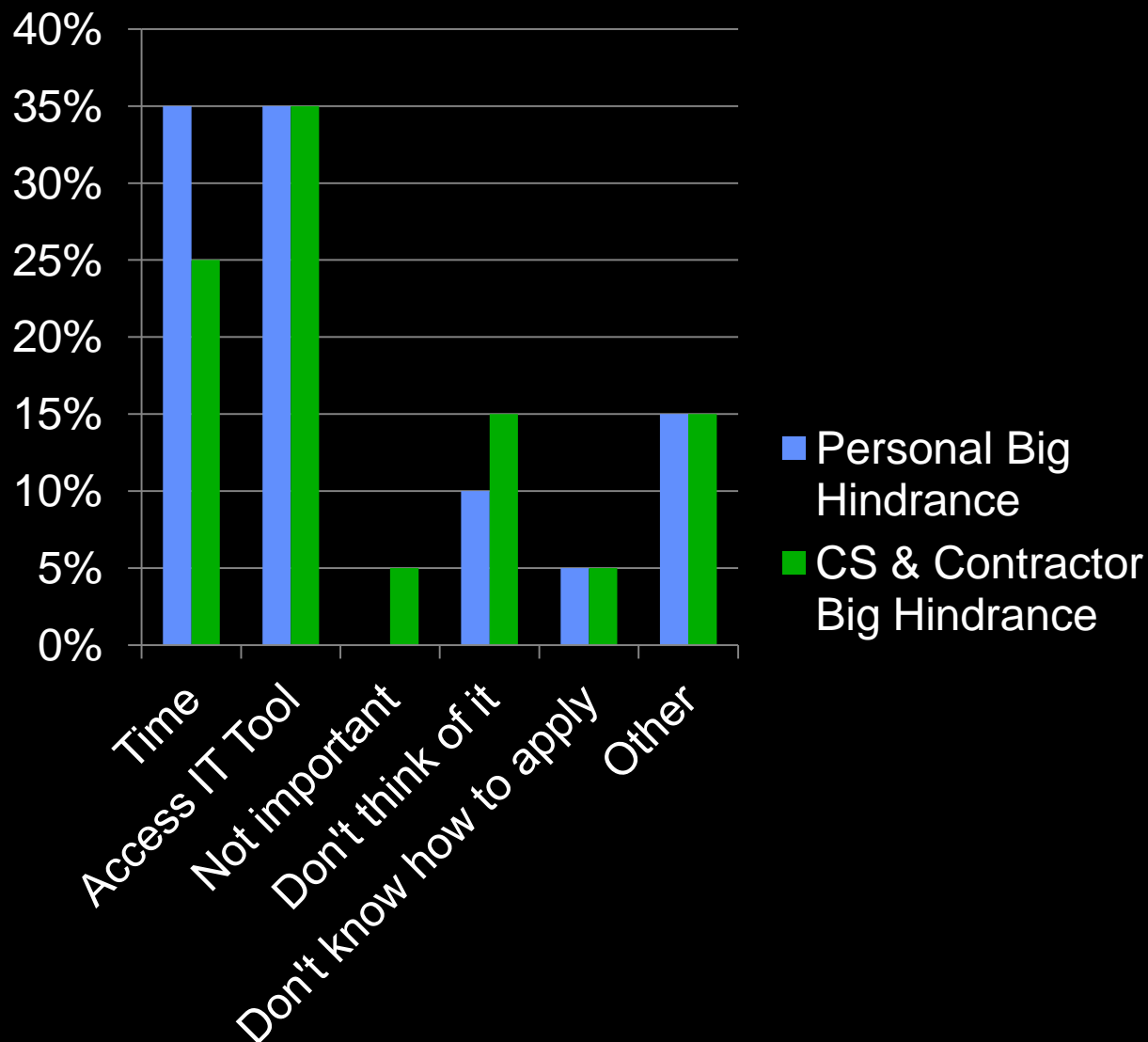
Lessons Learned Survey

Question 2 – 3 Comparison



To NASA civil service & contractor employees in general, what is the biggest hindrance to seeking out and using lessons learned before a new activity is started?

- Time
- Access to useful IT Tool
- Not important enough
- Don't think of it
- Don't know how to take a lessons learned
- Other
 - Asking co-workers for input
 - I'm a contractor





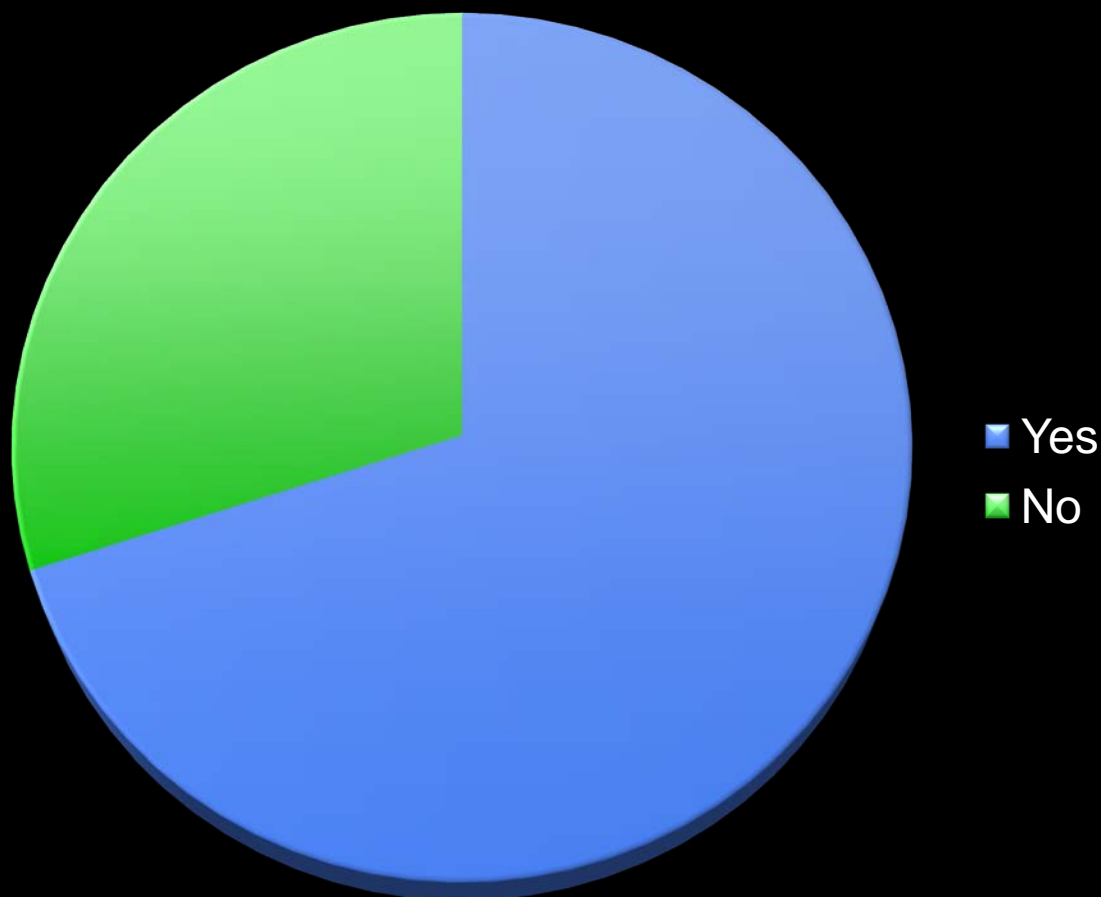
Lessons Learned Survey Question 4



Do you think NASA's lessons learned program is beneficial to the Agency?

- Yes
- No

Beneficial to NASA?



Lessons Learned Survey

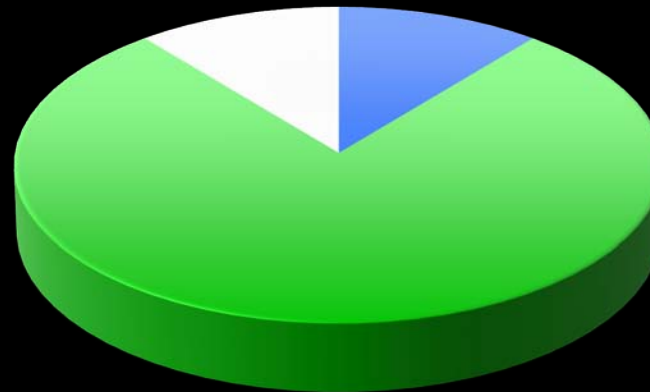
Question 5



If you answered “no” to question 4, what are the reasons you think lessons learned are not beneficial to the Agency? Select all that apply:

- The lessons learned passed on by others are too job specific; i.e. most of them do not apply to my job.
- We submit lessons learned, but there is no closed-loop process to ensure the issue is fixed for the future.
- Lessons learned program? What lessons learned program?

If not beneficial, why?



- Too job specific
- No closed loop-process
- What lessons learned program?



Lessons Learned Survey

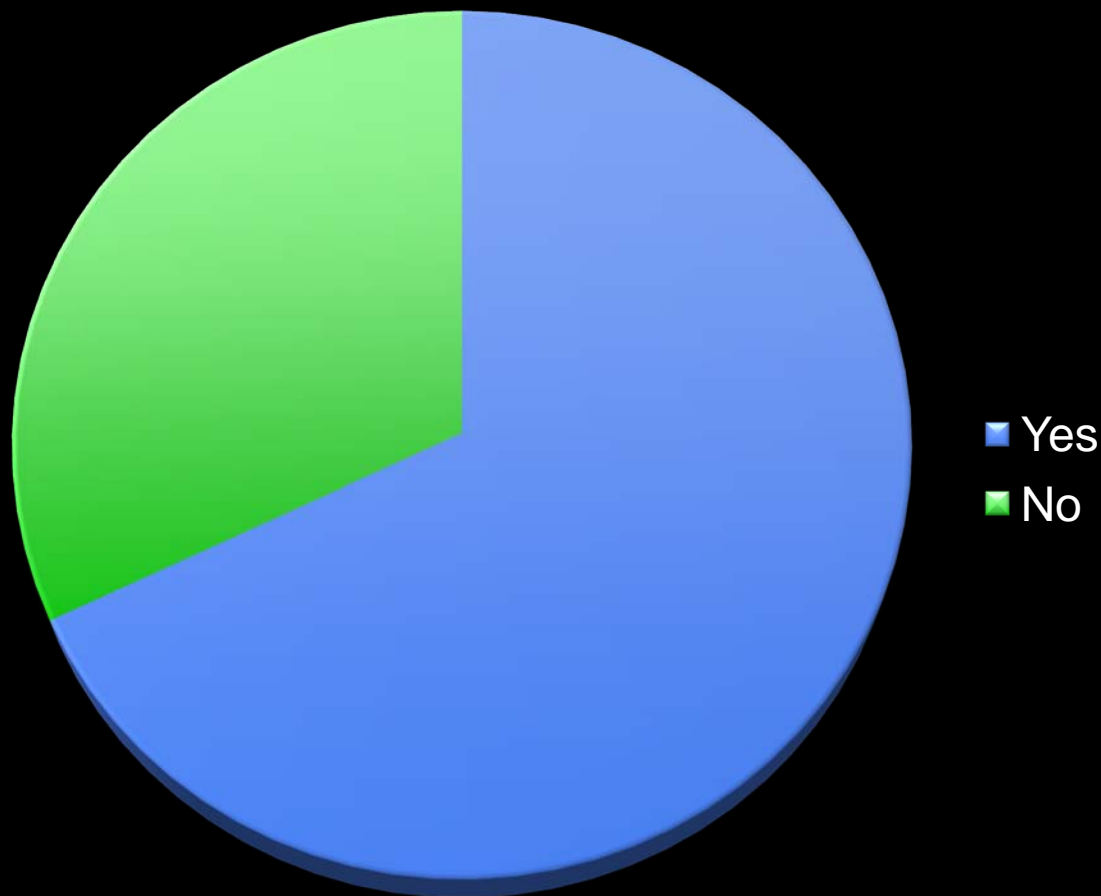
Question 6



Do you think the EVA Office's lessons learned program is beneficial to the EVA community?

- Yes
- No

Beneficial to EVA?



Lessons Learned Survey

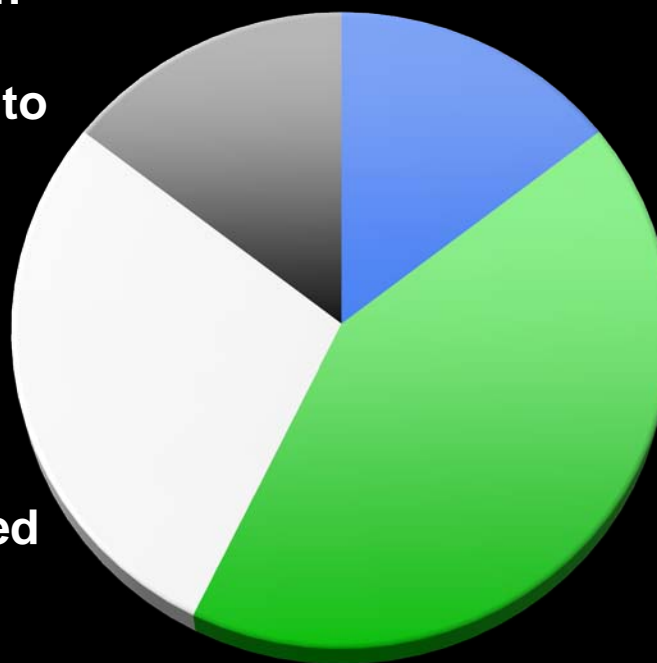
Question 7



If you answered “no” to question 6, what are the reasons you think lessons learned are not beneficial to the EVA community? Select all that apply:

- The lessons learned passed on by others are too job specific; i.e. most of them do not apply to my job.
- We submit lessons learned, but there is no closed-loop process to ensure the issue is fixed for the future.
- Lessons learned program? What lessons learned program?
- Other, please specify:
 - ✦ Not knowledgeable on what exists.

If not beneficial to EVA, why?



- Too job specific
- No closed-loop process
- What lessons learned program?
- Other

Lessons Learned Survey

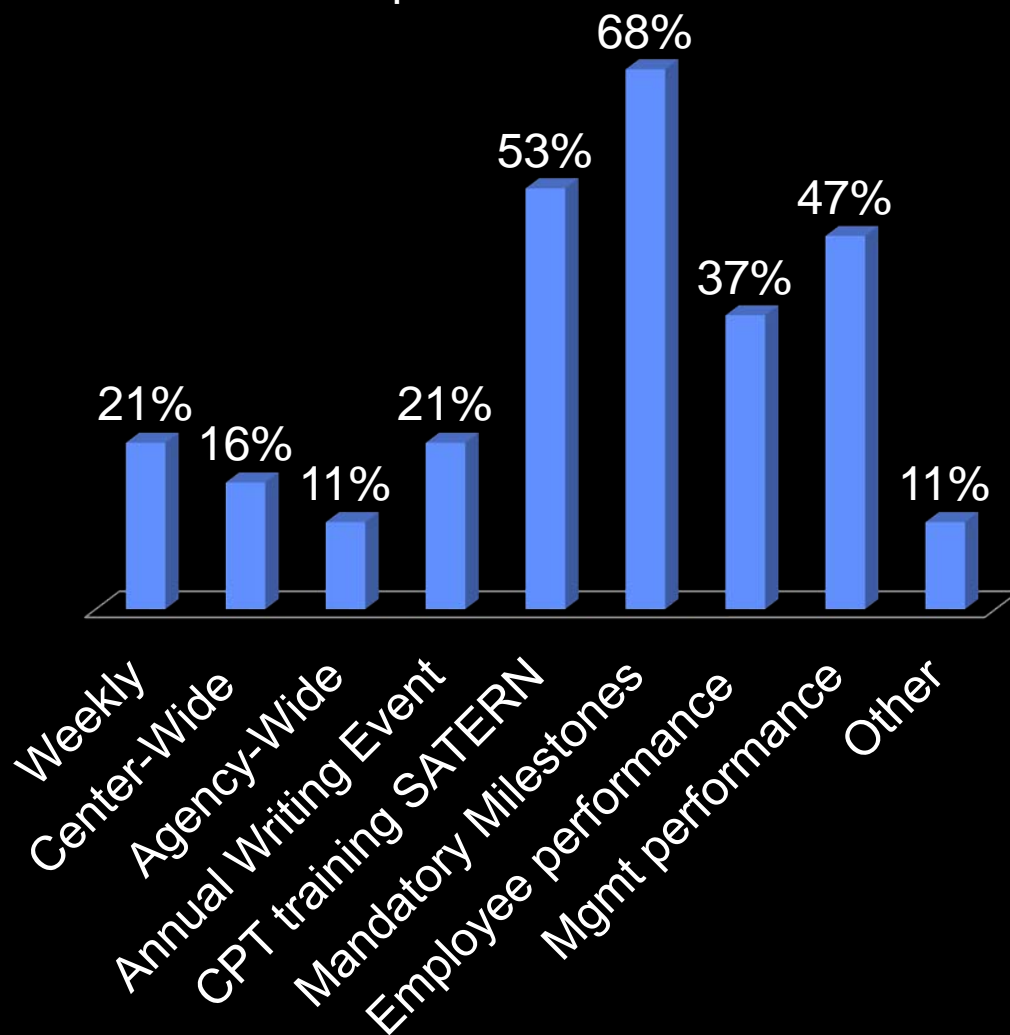
Question 8

Which ideas do you think would be effective for improving NASA's lessons learned efforts? Check all that you believe would help:

- Weekly LL topic at staff mtg
- Center-wide LL forums
- Agency-wide LL meetings
- Annual LL writing event
- CPT training module on SATERN
- Mandatory LL review prior to certain milestones
- Participation in LL written into performance plans
- LL participation written into mgmt performance plans
- Other:
 - Program establish how & when each LL will be implemented
 - Quarterly LL

Ideas to Improve Lessons Learned

■ Ideas to Improve Lessons Learned



- The good news is that our troops (generally) think lessons learned are beneficial!
- The better news is that our employees think there are ways to make our lessons learned efforts *even more effective!*
- Let's look at each of the survey ideas for improving lessons learned, and at how they could be implemented
 - EVA already does some of these*, so we will include our “lessons learned” on “lessons learned”! (*only at NASA...*)



*Those already implemented by EVA will be denoted with an asterisk

- **Mandatory Lessons Learned Sessions as Part of Flight or Project Milestones* (68%)**
 - EVA Office has used this extensively post-EVA for collecting lessons learned
 - Could make part of hardware PDR/CDR to review past lessons learned on hardware projects, then share new lessons post-project
 - Could make part of Certification of Flight Readiness (CoFR) to review applicable lessons learned and verify they are incorporated into procedures, designs, processes, etc.
 - Lessons Learned*
 - Develop an acceptance criteria or process
 - Use a rigorous closed-loop action system for implementation of each accepted lesson learned
 - Require review of lessons learned for applicability prior to starting a new activity (new EVA, new hardware project, etc.)
 - Consider whether there is a lesson applicable to other offices within your center, or even within the Agency, and share accordingly

- **CPT Modules on SATERN (53%)**

- Survey question focused on “How-To's” for using or submitting lessons learned to Agency database
 - “Provide a CPT training module on SATERN, available to all civil service and contractor employees, that outlines lessons learned tools and resources available, and trains users on how to use them.”
- Other ideas for incorporating use of SATERN training in Lessons Learned programs
 - Video-recorded storytelling of wide interest (Apollo Program Management lessons learned, etc.)
 - Video recorded classes of wide interest that Agency cannot necessarily afford to let every employee attend (Spacecraft Development Lessons Learned, exceptional presentations from PM Challenge, etc.)
 - Modules containing pointers and ideas for implementing lessons learned activities at individual office/directorate levels



PROMOTING LESSONS LEARNED



- **Make Lessons Learned part of employee (37%) and management (47%) performance plans**
 - Similar to safety goals listed in performance plans - makes lessons learned more obviously important to both employees and managers
 - Include use of lessons learned in performing work, not just providing lessons learned to others
 - Set and flow down Agency, Center, or office goals for lessons learned on each performance plan
 - Examples
 - Submitting some number of lessons learned to the Center or Agency database (good management goal)
 - Hosting or sponsoring some number of lessons learned events per year (good management goal)
 - Having each employee give a weekly lesson learned presentation each year (good employee goal)



PROMOTING LESSONS LEARNED



- **Weekly “Lessons Learned” topics at the beginning of staff meetings* (21%)**
 - Similar to “safety moments” that are so much a part of everything we do at NASA
 - Intent is to infuse lessons learned into things we already do
 - Make lessons learned part of NASA’s culture, as we did with safety
 - Lessons Learned*
 - Get top and middle management buy-in and input prior to starting this activity
 - Repeatedly advertise the activity and its purpose for employee buy-in
 - Divvy up the workload for providing lessons learned (don’t make the person responsible for lessons learned within your organization be responsible for providing ALL lessons learned)
 - Allow for storytelling, as well as lessons learned

- **Annual Lessons Learned Writing Events (21%)**
 - Could be hosted by Agency, Centers, or even individual programs, projects, and offices
 - Goal could be to review activity over the past year, and write lessons learned in the appropriate Agency, Center, or Directorate format to include in database(s)
 - Need to keep in mind our lessons learned from milestone activities
 - Develop an acceptance criteria or process
 - Use a rigorous closed-loop action system for implementation of each accepted lesson learned
 - Require review of lessons learned for applicability prior to starting a new activity (new EVA, new hardware project, etc.)
 - Consider whether there is a lesson applicable to other offices within your center, or even within the Agency, and share accordingly

- **Center-Wide Forums (16%)**

- JSC has been successfully hosting center-wide "Storytelling" events
- Examples: "The Science of Apollo: What We Learned About the Moon", "Lessons Learned from Columbia", "Science of Opportunity on ISS", "Benefits of ISS Research", "A Conversation with Apollo Alumni"
- Advertised in daily email to all JSC employees
- Generally well attended
- Videos and audios available to those that could not attend on "JSC Knowledge Online" site on the JSC internal web

- **Agency-wide lessons learned forums (11%)**
 - Survey question focused on “How-To's” of Agency Lessons Learned program
 - “Have Agency-wide ViTS meetings led by the Agency Chief Engineer to provide an overview of lessons learned tools and resources available.”
 - Other ideas for incorporating use of Agency-wide, Chief Engineer led Lessons Learned activities
 - Video Teleconferencing System (ViTS) forums with NASA Chief Engineer on various lessons learned - each Center could share one widely-applicable lesson learned
 - Monthly WebEx learning sessions on various NPRs and/or specific Lessons Learned with potential agency-wide application
- **PM Challenge is a GREAT EXAMPLE of an Agency-wide lessons learned forum!**

The presenters wish to acknowledge the time and talents of

Mr. David Foltz, JSC EVA Office

for his work putting together the video shown at the beginning of our presentation.